

CLAIMS

We claim:

1. A thermal transfer material, comprising:
 - 5 a heat spreader component, wherein the heat spreader component comprises a top surface, a bottom surface and at least one heat spreader material, and at least one solder material, wherein the solder material is directly deposited onto the bottom surface of the heat spreader component.
 2. The thermal transfer material of claim 1, wherein the solder material is further coupled to a substrate.
 - 10 3. The thermal transfer material of claim 2, wherein the substrate comprises silicon.
 4. The thermal transfer material of claim 3, wherein the substrate is a metalized silicon die.
 5. The thermal transfer material of claim 1, wherein the heat spreader component comprises a metal, metal-based material or combination thereof.
 - 15 6. The thermal transfer material of claim 5, wherein the heat spreader component comprises nickel, aluminum, copper or a combination thereof.
 7. The thermal transfer material of claim 5, wherein the metal-based material comprises silicon, carbon or a combination thereof.
 8. The thermal transfer material of claim 1, wherein the heat spreader component 20 comprises a thickness of about 0.25 mm to about 6 mm.
 9. The thermal transfer material of claim 8, wherein the thickness is from about 1 mm to about 5 mm.
 10. The thermal transfer material of claim 1, wherein the at least one solder material comprises a metal, a metal-based material or a combination thereof.
 - 25 11. The thermal transfer material of claim 10, wherein the metal comprises a transition metal.
 12. The thermal transfer material of claim 11, wherein the metal comprises indium, tin, lead, silver, copper, antimony, tellurium or bismuth.

13. The thermal transfer material of claim 11, wherein the metal-based material comprises an alloy.
14. The thermal transfer material of claim 13, wherein the alloy comprises indium, tin, lead, silver, copper, antimony, tellurium, bismuth or a combination thereof.
- 5 15. The thermal transfer material of one of claims 12 or 13, further comprising a layer of a noble metal or a low temperature silicide former.
16. The thermal transfer material of claim 15, wherein the low temperature silicide former comprises silver, platinum or palladium.
- 10 17. The thermal transfer material of claim 16, wherein the low temperature silicide former produces a flash layer.
18. The thermal transfer material of claim 1, wherein the solder material is directly deposited using electrodeposition.
19. A method of forming a thermal transfer material, comprising:
 - providing a heat spreader component, wherein the heat spreader component 15 comprises a top surface, a bottom surface and at least one heat spreader material;
 - providing at least one solder material, wherein the solder material is directly deposited onto the bottom surface of the heat spreader component; and
 - depositing the at least one solder material onto the bottom surface of the heat 20 spreader component.
20. The method of claim 19, wherein the solder material is further coupled to a substrate.
21. The method of claim 20, wherein the substrate comprises silicon.
22. The method of claim 21, wherein the substrate is a metalized silicon die.
- 25 23. The method of claim 19, wherein the heat spreader component comprises a metal, metal-based material or combination thereof.
24. The method of claim 23, wherein the heat spreader component comprises nickel, aluminum, copper or a combination thereof.

25. The method of claim 23, wherein the metal-based material comprises silicon, carbon or a combination thereof.
26. The method of claim 19, wherein the heat spreader component comprises a thickness of about 0.25 mm to about 6 mm.
- 5 27. The method of claim 26, wherein the thickness is from about 1 mm to about 5 mm.
28. The method of claim 19, wherein the at least one solder material comprises a metal, a metal-based material or a combination thereof.
29. The method of claim 28, wherein the metal comprises a transition metal.
30. The method of claim 29, wherein the metal comprises indium, tin, lead, silver, 10 copper, antimony, tellurium or bismuth.
31. The method of claim 29, wherein the metal-based material comprises an alloy.
32. The method of claim 31, wherein the alloy comprises indium, tin, lead, silver, copper, antimony, tellurium, bismuth or a combination thereof.
33. The method of one of claims 30 or 31, further comprising a layer of a noble metal 15 or a low temperature silicide former.
34. The method of claim 33, wherein the low temperature silicide former comprises silver, platinum or palladium.
35. The method of claim 34, wherein the low temperature silicide former produces a flash layer.
- 20 36. The method of claim 19, wherein the solder material is directly deposited using electrodeposition.